Standard Operating Procedure Interim Change Notice (ICN)

Effective Date: **12/17/2001;** Reviewed Date: **04/20/2004**

Part I: Description of Change (Requestor completes)

1. Document Catalog No.: **ER2001-0988**

2. SOP No.: 01.02

3. Revision/Interim Change No.: 1 (Current)

4. SOP Title: Sample Containers and Preservation

5. Description of Change: (Attach marked-up pages if necessary)

Clarification of three in section 8.6.1. Sentence three reads, "The proper reagents should be in a easily usable form that can be added at the time of sampling." Clarification of this sentence is that the sample should be preserved as soon as feasibly possibly after collection or within 8 hours whichever is more stringent.

6. Attachments Modified, Added, or Removed: ☐ Yes ☒ No

7. Justification for ICN:

This ICN is being written because of non-specifity of a sentence which was identified during a QA audit.

8. Requestor: Keith Greene [Signature on file in RPF.] 12/10/01

(Print name, then sign) (Date)

Part II: Evaluation and Approval (QPPL and the Focus Area Leader completes)

9. Evaluation Remarks: (If none enter N/A)

NA

10. Focus Area Leader: Steve Bolivar [Signature on file in RPF.] 12/11/01

(Print name, then sign) (Date)

11. QPPL: Larry Maassen [Signature on file in RPF.] 12/11/01

(Print name, then sign) (Date)

Identifier:	Revision:	Effective Date:
ER-SOP-01.02	**1**	**10/05/01**

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Author: Keith Greene

environmental restoration project

A Department of Energy
Environmental Cleanup Program

Environmental Restoration Project
Standard Operating Procedure

for:

Sample Containers and Preservation

Los Alamos
NATIONAL LABORATORY
Los Alamos, New Mexico 87545

Revision Log

Revision No.	*Effective Date*	*Prepared By*	*Description of Changes*	*Affected Pages*
0	03/16/92	Sandra Wagner	New Procedure	All
1	10/05/01	Keith Greene	Revised to address process changes and to meet current procedure format requirements.	All

Sample Containers and Preservation

Table of Contents

Sample Containers and Preservation

1.0 PURPOSE

This Standard Operating Procedure (SOP) describes the specific requirements/process for sample containers, preservation techniques, and holding times as specified by field regulations and guidance documents. This procedure is applicable to all Environmental Restoration (ER) Project activities involving the collection and preservation of samples that will be taken to the Los Alamos National Laboratory (Laboratory) Sample Management Office (SMO) for subsequent chemical or physical testing.

2.0 SCOPE

2.1 This SOP is a mandatory document and shall be implemented by all ER Project personnel when collecting environmental samples for the ER Project.

2.2 Subcontractors performing work under the ER Project's quality program may follow this SOP for Sample Containers and Preservation or may use their own procedure(s) as long as the substitute meets the requirements prescribed by the ER Project Quality Management Plan, and is approved by the ER Project's Quality Program Project Leader (QPPL) before the commencement of the designated activities.

3.0 TRAINING

3.1 The **Field Team Leader** (FTL) is responsible for ensuring that field team members who perform field sampling for the ER Project are familiar with the objectives of and properly trained in the procedures of containing and preserving field samples. In addition, all field team members must document that they have read and understand this procedure in accordance with QP-2.2.

3.2 The **FTL** shall monitor the proper implementation of this procedure and ensure that relevant team members have completed all applicable training assignments in accordance with QP-2.2.

4.0 DEFINITIONS

4.1 *Holding time* — Maximum Time between sample collection and sample preparation and/or analysis that a sample can be stored without unacceptable changes in analyte concentration.

4.2 *Site-Specific Health and Safety Plan (SSHASP)* — A health and safety plan that is specific to a site or ER-related field activity that has been approved by an ER health and safety representative. This document contains information specific to the project including scope of work, relevant history, descriptions of hazards by activity associated with the project site(s), and techniques for exposure mitigation (e.g., personal protective equipment [PPE]) and hazard mitigation.

5.0 BACKGROUND AND PRECAUTIONS

5.1 Use this SOP in conjunction with an approved SSHASP; also, consult the SSHASP for information on and use of all PPE.

5.2 The use of specific types of sample container and preservation techniques is mandatory for hazardous site investigations because the integrity of any sample is diminished over time. Physical factors (light, pressure, temperature, etc.), chemical factors (changes in pH, volatilization, etc.), and biological factors may alter the original quality of the sample. Because the various target parameters are uniquely altered at varying rates, distinct sample containers, preservation techniques, and holding times have been established to maintain sample integrity for a reasonable and acceptable period of time.

5.3 The volume of sample collected should be sufficient to perform all the required analyses, plus an additional amount to provide for any quality control needs, split samples, or repeat examinations. The volumes, preservatives, and holding times listed in Attachment A. Since the SMO will be making arrangements for the analyses, sampling schedules and sample needs must be coordinated with the SMO prior to sampling.

5.4 All proposed SAPs are reviewed and approved through the LANL Peer review process. The **FTL** is responsible for coordination of all activities. These include, but are not limited to, adhering to SAP requirements, ordering the correct analytical methods and paperwork through the SMO (sample collection logs and chain of custody), obtaining the correct bottles, labels and coolers, arranging the field team efforts and providing the screening results for shipment/transport requirements. The **FTL** is also responsible for adherence to sampling protocols mandated by all applicable federal and state regulatory requirements and analytical methods.

5.5 The SAP shall address the proper analytical protocol. The EPA has established test methods and guidance that are recommended for use in conducting the evaluations and measurements. The topics of concern include the sampling schedule, proper sample sizes and containers, correct

preservation techniques, chain-of-custody requirements, and transportation of samples to the SMO.

5.6 Following properly documented field procedures will ensure that samples do not become contaminated through sampling activities.

5.7 All waste generated from sampling shall be handled in accordance with ER-SOP-01.06.

6.0 RESPONSIBLE PERSONNEL

The following personnel are responsible for activities identified in this procedure.

6.1 ER Project Personnel

6.2 Field Personnel

6.2 Field Team Leader

6.3 Focus Area Leader

6.4 Quality Program Project Leader

6.5 SMO Personnel

6.6 SMO Team Leader

6.7 Subcontractors

7.0 EQUIPMENT

Equipment needed to implement this procedure is listed on the Equipment and Supplies Checklist for Sample Containers and Preservation (Attachment C).

8.0 PROCEDURE

8.1 Use Current Procedure

ER Project personnel may produce paper copies of this procedure printed from the controlled-document electronic file located at http://erinternal.lanl.gov/home_links/Library_proc.shtml. However, it is their responsibility to ensure that they trained to and utilize the current version of this procedure. The author may be contacted if text is unclear. Contract the Document Control Coordinator if the author cannot be located.

8.2 Document SOP Deviations

Deviations from SOPs are made in accordance with QP-4.2, Standard Operating Procedure Development, and documented in accordance with QP-5.7, Notebook Documentation for Environmental Restoration Technical Activities.

8.3 Use Proper Sample Containers and Preservatives

8.3.1 Contact the SMO for guidance and assistance in obtaining the proper sample containers and preservatives. In addition, follow the protocols established in EPA's SW-846, Test Methods for Evaluation of Solid Waste.

8.3.2 Sample collection logs (SCLs), Chain of Custody (COCs) and individual bottle identification stickers must be requested through CDM and the SMO. These should be filled out on the proper request forms (Attachment B). These should be requested in accordance with the SAP requirements. Please allow at least 24 hours for your request to be facilitated. The SMO will call when the request has been filled.

8.3.3 Identify and obtain the appropriate containers required for the specific analyses by matrix as shown in Attachment A and on the SCLs. These bottles should be obtained through the SMO. Make sure that the bottles match the paperwork or revisions will have to be performed at the time that the samples are returned to the SMO for shipment to the analytical laboratory.

8.3.4 Bottles obtained from other sources must be pre-cleaned and certified by the vendor. The certificate of analysis should be retained for your records.

8.3.5 All water samples for volatile and semi-volatile organics should contain extra aliquots for the potential of laboratory quality control problems and/or breakage during shipment.

8.3.6 Acquire a sufficient number of containers to ship the proper sample volume. For example, Department of Transportation (DOT) and International Air Transport Authority (IATA) regulations limit the size of a sample container to 16 oz if the contents may include hazardous materials. In this case, two 500-ml or four 250-ml containers would be required to ship a 1-liter fluid sample.

8.3.7 Adhere to DOT regulations for on-site transfer of samples to the SMO over public-access roads. Refer to SOP-1.03, Handling, Packaging, and Shipping of Samples, for additional information.

8.3.8 Identify and obtain all needed supplies (Attachment C) for the field effort.

8.4 Perform Data Entry

Record all pertinent comments and any deviations on the Sample Collection Log or Field Logbook per LANL ER-SOP-01.04.

8.5 Implement Containment Procedures

8.5.1 For each type of sampling and each media to be sampled follow the appropriate SOP to meet the technical and quality requirements of the sampling as defined in the SAP (the SAP must list the specific sampling SOPs to follow for each sample). Sample bottles should be kept in a clean, dry place until the sample has been collected and is ready to be transferred to the appropriate container.

8.5.2 For all matrices, the bottles should be filled in the following order. Volatile organics, semi-volatile organics, metals, other inorganic parameters, and radiochemistry.

Note: The compounds to be sampled are placed in a specific class of chemical specification. Volatile organics are compounds that will normally be a gas or volatilize to a gas at normal standard temperature and pressure (gasoline, tetrachloroethane, etc.). These methods are representative of SW-846 method 8015 Total Petroleum Hydrocarbons Gasoline Range Organics (TPH-GRO) and EPA SW-846 method 8260. Semi-volatile organics are compounds that will not volatilize at normal standard temperature and pressure (pesticides, PCBs, high explosives, diesel, and PAHs). These methods are representative of 8270, 8081, 8082, 8330, 8151, and 8290.

8.5.3 Special consideration should be taken for sampling volatile organic constituents. Solid samples should be taken in encore samplers or the specific jar should be filled completely as possible. Encore samplers should only be used for site characterization samples. The sides of the jar should be tapped slightly as they are being filled to try and eliminate as much air space as possible. Liquid samples should be poured into the vials without introducing any air bubbles. Should bubbling occur as a result of vigorous pouring, the sample must be discarded and the vial refilled. The vials should be completely filled at the time of sampling, so that when the septum cap is fitted and sealed, and the vial is inverted, no headspace is visible. Appropriately filled vials must not be opened again prior to analysis. Preservation must be performed before the sample is taken. Pea-size bubbles may accumulate in the vials during storage due to solubility differences affected by temperature change. This should not adversely affect the sample integrity. This will happen during storage but should not be present at the time of sampling.

8.5.4 When sampling sludges, take into consideration the consistency of the material. The laboratory will extract or analyze the sample with respect to the relative percent of liquid and solid components. If the sludge is mostly water with relatively low solid content (<40% solids)

use the appropriate water sample containers. If the specific analysis to be performed is only applicable to a certain fraction of the sludge, the sampler must note this on the COC.

8.6 Preserve Samples

8.6.1 The **field team** must perform preservation. The SMO does not provide or perform preservation capabilities. The proper reagents should be in an easily usable form that can be added at the time of sampling.

8.6.1.1 If using an acid or base preservative, check the sample pH with pH paper.

8.6.1.2 Preservation required for the specific analyses requested for all samples may be determined by using Attachment A, or by consulting the applicable referenced documents.

8.6.2 Additional handling requirements include placing them in an insulated container (cooler) and maintained on ice (ice in bags or chemical "blue" ice) at 4° Centigrade (C) within 8 hours of sample collection (where applicable). Avoid freezing the sample (particularly when using a small, less than 40 ml, glass container) by wrapping it in bubble pack to isolate it from the "blue" ice.

8.7 Implement Holding Times

8.7.1 The **FTL** must consider holding times and shipment schedules when taking samples. Proper scheduling will minimize potential effects to samples due to holding time concerns.

8.7.2 Holding times for all methods start when the sample is collected. Both the sampler and the subcontract analytical laboratory must use this date/time. If the holding times are expressed in days, the sample must be extracted/analyzed before the time frames specified in Attachment A are exceeded. If the holding time is expressed in hours then the sample must be extracted/analyzed before the time frames specified in Attachment A are exceeded. Please take into account time zone differences when collecting samples.

8.7.3 Some parameters are required to be analyzed in the field (refer to Attachment A). Allowable holding times are listed and are the maximum times that samples are considered valid.

8.7.4 If the site has suspected radiation contamination, rad screening results shall be needed for the SMO or BUS-4 to ship the samples. The **FTL** shall consider this in sample scheduling and shipping requirements. Consult the applicable SOP (1.03 and 15.15) for handling and transporting the samples.

8.7.5 If the samples are suspected to have a total radiation concentration of >2pci/g the samples can not leave the sampling location and the requirements specified in SOP 1.03 and 40 CFR 173.431 shall be fulfilled. The **FTL** must meet the chain of custody requirements in SOP 1.04. The samples shall be preserved and secured at the site until the shipping requirements are met and the samples are removed from the site.

8.8 Complete Documentation

8.8.1 Complete and record all pertinent comments, deviations and field parameters on the appropriate field data sheets as required by SOP 1.04.

8.8.2 For each sample collected, initiate a custody record on Chain-of-Custody/Request-for-Analysis Form (Attachment C in **ER-SOP-01**.04) and a Sample Collection Log (Attachment B in ER-SOP 1.04). Affix a Sample Label to each sample container.

8.9 Implement Post-operation Activities

Decontaminate all sampling equipment upon completion of sampling activities. Handle all waste generated from decontamination in accordance with ER-SOP-01.06.

8.10 Perform Lessons Learned

During the performance of work, **ER Project personnel** shall identify, document, and submit lessons learned, as appropriate in accordance with QP-3.2, Lessons Learned, located at http://erinternal.lanl.gov/home_links/Library_proc.shtml.

9.0 REFERENCES

ER Project personnel using this procedure should become familiar with the contents of the following documents located at http://erinternal.lanl.gov/home_links/Library_proc.shtml to properly implement this SOP.

- ER Project Quality Management Plan
- QP-2.2, Personnel Orientation and Training
- QP-4.2, Standard Operating Procedure Development
- QP-4.4, Record Transmittal to the Records Processing Facility
- QP-5.7, Notebook Documentation for Environmental Restoration Technical Activities
- ER-SOP-01.03, Handling, Packaging, and Shipping of Samples

- ER-SOP-01.04, Sample Control and Field Documentation
- ER-SOP-01.08, Field Decontamination of Drilling and Sampling Equipment
- ER-SOP-6.03, Sampling for Volatile Organics
- ER-SOP-015.15, Sample Management Office: Receiving and Shipping Analytical Samples
- LA-UR-00-776, March 2000, ER2000-0058 “Technical Guidance on EPA SW-846 Method 5035 Sampling
- Title 40 CFR Part 261
- Title 49 CFR Part 172.101
- EPA (U.S. Environmental Protection Agency), "Handbook for Sampling and Sample Preservation of Water and Wastewater," Report EPA-600/4-82-029. Washington, D.C., 1982.
- EPA, "Methods for Chemical Analysis of Water and Wastes," Report EPA-600/4-79-020, Washington, D.C., 1983.
- EPA, "Manual of Groundwater Quality Sampling Procedures," Report EPA/600/2-81-160, Washington, D.C., 1983.
- EPA, "Test Methods for Evaluating Solid Waste," Report EPA-SW-846, Washington, D.C., 1986.
- EPA, "Practical Guide for Groundwater Sampling," Report EPA/600/2-85/104, U.S. Government Printing Office, Washington, D.C., 1985.
- EPA, "RCRA Groundwater Monitoring Technical Enforcement Guidance Document," Document OSWER-9950.1, U.S. Government Printing Office, Washington, D.C., 1986.
- EPA Region IV, “Environmental Compliance Branch Standard Operating Procedures and Quality Assurance Manual,” (Environmental Services Division, Athens, GA, 1991).
- Korte, Nic, and Peter Kearl, "Procedures for the Collection and Preservation of Groundwater and Surface Water Samples and for the Installation of Monitoring Wells: Second Edition," U.S. Department of Energy Report GJITMC-08 Technical Measurements Center, Grand Junction Project Office, Grand Junction, Colorado, 1985.
- Williams, M.C., Handbook for Sample Collection, Preservation, Instrumental Techniques, Los Alamos National Laboratory Report LA-1 1738-M, Los Alamos, New Mexico, 1990.

10.0 RECORDS

The **FTL** is responsible for submitting the following records (processed in accordance with QP-4.4, Record Transmittal to the Records Processing Facility) to the Records Processing Facility.

10.1 Completed Daily Activity Log forms (Attachment E in ER-SOP-01.04) or field notebook (QP-5.7) that includes:

- Deviations (if applicable)
- Calibration information
- A record of daily activities
- Any other pertinent information

10.2 Completed Chain-of-Custody Form/Request for Analysis Form (Attachment C ER-SOP-01.04).

10.3 Sample Collection Log (Attachment B in ER-SOP-01.04).

11.0 ATTACHMENTS

Attachment A: Sample Preservation and Holding Times (8 pages)

Attachment B: Example Sample Paperwork Request Forms (1 page) located at http://erinternal.lanl.gov/Quality/user/forms.asp

Attachment C: Equipment List (1 page) located at http://erinternal.lanl.gov/Quality/user/forms.asp

Attachment D: Acronyms (1 page)

Attachment A, Sample Preservation Techniques and Holding Times

Parameter(s)	Method	Matrix	Container[a]	Preservation[b]	Holding Time[b]	
					Sample	Extract
Inorganic Analytes:						
All metals except Hg and Cr(VI)[c]	SW-6010, 6020, and 7000-series	Water, Total	P, 500 mL	HNO_3 to pH<2 4 °C	180 Days	N/A
		Water, Dissolved	P, 500 mL	Filter on site; HNO_3 to pH<2, 4 °C	180 Days	N/A
		Water, Suspended	P, 500 mL	None, 4 °C	180 Days	N/A
		Solid/Other	G, 250 mL	None, 4 °C	180 Days	N/A
Hg	SW-7470	Water, Total	P, 500 mL	4 °C; HNO_3 to pH<2	28 Days	N/A
		Water, Dissolved	P, 500 mL	Filter on site; 4 °C; HNO_3 to pH<2	28 Days	N/A
	SW-7471	Solid/Other	G, 250 mL	4 °C	28 Days	N/A
Cr(VI)	SW-7196 or 7199	Water	P, 500 mL	4 °C	24 Hours	N/A
	SW-3060 and SW-7196 or 7199	Solid/Other	G, 250 mL	4 °C	30 Days	4 days

Sample Preservation Techniques and Holding Times (continued)

Parameter(s)	Method	Matrix	Container[a]	Preservation[b]	Holding Time[b]	
					Sample	Extract
Volatile Organic Analytes:						
Aromatic VOCs (BTEX)	SW-8021	Water	G(A), 2 x 40 mL	4 °C; HCl to pH<2	14 Days	N/A
		Solid/Other	G(A), 125 mL	4 °C	14 Days	N/A
Halogenated VOCs	SW-8021	Water	G(A), 2 x 40 mL	4 °C; HCl to pH<2	14 Days	N/A
		Solid/Other	G(A), 125 mL	4 °C	14 Days	N/A
VOCs	SW-8260	Water	G(A), 2 x 40 mL	4 °C; HCl to pH<2	14 Days	N/A
		Solid/Other	G(A), 125 mL Or ENCORE samplers (2)	4 °C	14 Days	N/A

Sample Preservation Techniques and Holding Times (continued)

Parameter(s)	Method	Matrix	Container[a]	Preservation[b]	Holding Time[b]	
					Sample	Extract
Volatile Organic Analytes:						
Gasoline range organics, TPH	SW-8015 Modified	Water	G(A), 2 x 40 mL	4 °C; HCl to pH<2	14 Days	N/A
		Solid/Other	G(A), 125 mL	4 °C	14 Days	N/A
Semivolatile Organic Analytes:						
Phenols	SW-8041	Water	G(A), 4 L	4 °C	7 Days	40 Days
		Solid/Other	G, 250 mL	4 °C	14 Days	40 Days
SVOCs	SW-8270	Water	G(A), 4 L	4 °C	7 Days	40 Days
		Solid/Other	G, 250 mL	4 °C	14 Days	40 Days
Organochlorine Pesticides, PCBs, and Herbicides:						
Pesticides/PCBs	SW-8081	Water	G(A), 4 L	4 °C	7 Days	40 Days
		Solid/Other	G, 250 mL	4 °C	14 Days	40 Days
PCBs	SW-8082	Water	G(A), 4 L	4 °C	7 Days	40 Days
		Solid/Other	G, 250 mL	4 °C	14 Days	40 Days

Sample Preservation Techniques and Holding Times (continued)

Parameter(s)	Method	Matrix	Container[a]	Preservation[b]	Holding Time[b]	
					Sample	Extract
Organochlorine Pesticides, PCBs, and Herbicides:						
Chlorinated Herbicides	SW-8151	Water	G(A), 4 L	4 °C	7 Days	40 Days
		Solid/Other	G, 250 mL	4 °C	14 Days	40 Days
Polychlorinated dioxins & furans	SW-8280/8290	Water	G(A), 4 L	4 °C	30 Days	45 Days
Polychlorinated dioxins & furans	SW-8280/8290	Solid/Other	G, 250 mL	4 °C	30 Days	45 Days
High Explosives:						
Nitroaromatics and Nitramines	SW-8330	Water	G(A), 4 L	4 °C	7 Days	40 Days
		Solid/Other	G, 250 mL	4 °C	14 Days	40 Days
Tetrazene	SW-8331	Water	G(A), 4 L	4 °C	7 Days	40 Days
		Solid/Other	G, 250 mL	4 °C	14 Days	40 Days
Nitroglycerine & PETN	SW-8332	Water	G(A), 4 L	4 °C	7 Days	40 Days
		Solid/Other	G, 250 mL	4 °C	14 Days	40 Days

Sample Preservation Techniques and Holding Times (continued)

Parameter(s)	Method	Matrix	Container[a]	Preservation[b]	Holding Time[b]	
					Sample	Extract
Miscellaneous Organic Analytes:						
Diesel range organics, TPH	SW-8015 Modified	Water	G(A), 2x1L	4 °C	7 Days	40 Days
		Solid/Other	G, 250 mL	4 °C	14 Days	40 Days
Organophosphorus Compounds	SW-8141	Water	G(A), 4 L	4 °C	7 Days	40 Days
		Solid/Other	G, 250 mL	4 °C	14 Days	40 Days
Nonvolatile organic compounds	SW-8321	Water	G(A), 4 L	4 °C	7 Days	40 Days
		Solid/Other	G, 250 mL	4 °C	14 Days	40 Days
PAHs in Filter Cartridges	TO-13	Adsorbate	Tenax, PUF, or XAD-2 Filter Cartridge	4 °C	7 Days	40 Days
VOCs	TO-14	Air	SUMMA® Canister	None	28 Days (by consensus)	N/A

Sample Preservation Techniques and Holding Times (continued)

Parameter(s)	Method	Matrix	Container[a]	Preservation[b]	Holding Time[b]	
					Sample	Extract
Radiological Analytes:						
All radiochemical parameters except radioactive iodine, tritium, and Radon-222		Water, Total	P, 1 L	HNO_3 to pH<2	180 Days	N/A
		Water, Dissolved	P, 1 L	Filter on site; HNO_3 to pH<2	180 Days	N/A
		Water, Suspended	P, 1 L	None	180 Days	N/A
		Solid/Other	G, 250 mL	None	180 Days	N/A
Tritium	Liquid scintillation counting	Water	P, 1 L	None	180 Days	N/A
		Solid/Other	G, 250 mL	None	180 Days	N/A
Radon-222	Liquid scintillation counting	Water	G(A), 2 x 40 mL	None	72 Hours	N/A
Inorganic Nonmetallic Analytes:						
Bromate, Bromide, Chlorate, Chloride, or Fluoride by IC	SW-9056 or EPA 300.0	Water	P, 1 L	4 °C	28 Days	N/A
		Solid/Other	G, 125 mL	4 °C	28 Days	N/A

Sample Preservation Techniques and Holding Times (continued)

Parameter(s)	Method	Matrix	Container[a]	Preservation[b]	Holding Time[b]	
					Sample	Extract
Inorganic Nonmetallic Analytes:						
Perchlorate	EPA 314.0 or 300.0	Water	P, 100 mL	4 °C	28 Days	N/A
		Solid/Other	G, 125 mL	4 °C	28 Days	N/A
Bromide	EPA 320.1	Water	P, 100 mL	4 °C	28 Days	N/A
Chlorite by IC	EPA 300.0	Water	P, 100 mL	4 °C	Immediately	N/A
Chloride	SW-9250; or EPA 325.1, 325.2, or 325.3	Water	P, 100 mL	4 °C	28 Days	N/A
Cyanide, total	SW-9010 or 9012; EPA 335.4	Water	P, 1 L	4 °C; NaOH to pH>12	14 Days	N/A
	SW-9010 or 9012	Solid/Other	G, 125 mL	4 °C	14 Days	N/A
Fluoride	EPA 340.1, 340.2, or 340.3	Water	P, 500 mL	4 °C	28 Days	N/A
Iodide	EPA 345.1	Water	P, 100 mL	4 °C	24 Hours	N/A
NH_3 - Nitrogen (Ammonia)	EPA 350.1, 350.2, or 350.3	Water	P, 1 L	4 °C; H_2SO_4 to pH<2	28 Days	N/A
NO_2 - Nitrogen (Nitrite)	EPA 300.0 or EPA 354.1	Water	P, 500 mL	4 °C	48 Hours	N/A
NO_3 - Nitrogen (Nitrate)	EPA 300.0 or EPA 352.1	Water	P, 500 mL	4 °C	48 Hours	N/A

Sample Preservation Techniques and Holding Times (continued)

Parameter(s)	Method	Matrix	Container[a]	Preservation[b]	Holding Time[b]	
					Sample	Extract
Inorganic Nonmetallic Analytes:						
Nitrate + Nitrite Nitrogen	EPA 353.1, 353.2, or 353.3	Water	P, 500 mL	4 °C; H_2SO_4 to pH<2	28 Days	N/A
		Solid/Other	G, 250 mL	4 °C	28 Days	N/A
Orthophosphate - Phosphorus by IC	EPA 300.0	Water	P, 500 mL	4 °C	48 Hours	N/A
Phosphorus:						
Hydrolysable	EPA 365.1, 365.2, or 365.3	Water	P, 500 mL	4 °C; H_2SO_4 to pH<2	28 Days	N/A
Total	EPA 365.1, 365.2, 365.3, or 365.4	Water	P, 500 mL	4 °C; H_2SO_4 to pH<2	28 Days	N/A
Total, dissolved	EPA 365.1, 365.2, 365.3, or 365.4	Water	P, 500 mL	Filter on site; 4 °C; H_2SO_4 to pH<2	24 Hours	N/A
Silica, dissolved (SiO_2)	EPA 370.1	Water	P, 125 mL	Filter on site; 4 °C	28 Days	N/A

Sample Preservation Techniques and Holding Times (continued)

Parameter(s)	Method	Matrix	Container[a]	Preservation[b]	Holding Time[b]	
					Sample	Extract
Inorganic Nonmetallic Analytes:						
Sulfide (S^{2-})	EPA 376.1 or 376.2	Water	P, 500 mL	4 °C; 2 mL zinc acetate plus NaOH to pH>9	7 Days	N/A
Sulfate (SO_4^{2-})	EPA 300.0 or EPA 375.1, 375.2, 375.3, or 375.4	Water	P, 500 mL	4 °C	28 Days	N/A
Sulfate (SO_4^{2-})	EPA 300.0 or EPA 375.1, 375.2, 375.3, or 375.4	Solid/Other	G, 125 mL	4 °C	28 Days	N/A
Aggregate Analytes:						
Acidity as $CaCo_3$	EPA 305.1	Water	P, 500 mL	4 °C	14 Days	N/A
Alkalinity as $CaCo_3$	EPA 310.1 or EPA 310.2	Water	P, 500 mL	4 °C	14 Days	N/A
Biological oxygen demand (BOD)	EPA 405.1	Water	P, 1L	4 °C	48 Hours	N/A
Carbon, dissolved organic (DOC)	EPA 415	Water	G(A), 250 mL	Filter on site; 4 °C; H_2SO_4 or HCl to pH<2	28 Days	N/A

Sample Preservation Techniques and Holding Times (continued)

Parameter(s)	Method	Matrix	Container[a]	Preservation[b]	Holding Time[b]	
					Sample	Extract
Aggregate Analytes:						
Carbon, total organic (TOC)	SW-9060; EPA 415.1	Water	G(A), 250 mL	4 °C; H_2SO_4 to pH<2	28 Days	N/A
		Solid/Other	G, 125 mL	4 °C	28 Days	N/A
Chemical oxygen demand (COD)	EPA 410.1, 410.2, 410.3, 410.4	Water	P, 500 mL	4 °C; H_2SO_4 to pH<2	28 Days	N/A
Color	EPA 110.1, EPA 110.2, or EPA 110.3	Water	P, 500 mL	4 °C	48 Hours	N/A
Hardness as $CaCO_3$	EPA 130	Water	P, 1 L	4 °C	28 Days	N/A
Nitrogen - Total Kendal	EPA 351.1, 351.2, 351.3, or 351.4	Water	P, 1 L	4 °C; H_2SO_4 to pH<2	28 Days	N/A
		Solid/Other	G, 250 mL	4 °C	28 Days	N/A
Oil and grease, total recoverable	SW-9070; EPA 413.1 or 413.2	Water	G, 1 L	4 °C; H_2SO_4 to pH<2	28 Days	N/A

Sample Preservation Techniques and Holding Times (continued)

Parameter(s)	Method	Matrix	Container[a]	Preservation[b]	Holding Time[b]	
					Sample	Extract
Aggregate Analytes:						
Petroleum hydrocarbons, total recoverable	EPA 418.1	Water	G(A), 1 L	4 °C; H_2SO_4 to pH<2	28 Days	N/A
		Solid/Other	G, 125 mL	4 °C	28 Days	N/A
Phenolics, total recoverable	SW-9065; or EPA 420.1, 420.2, or 420.3	Water	G, 1 L	4 °C; H_2SO_4 to pH<2	28 Days	N/A
		Solid/Other	G, 125 mL	4 °C	28 Days	N/A
pH	SW-9040; SW-9045; or EPA 150.1 or 150.2	Water	P, 125 mL	None	Immediately	N/A
Specific conductance	SW-9050; EPA 120	Water	P, 125 mL	4 °C	28 Days	N/A
Solids:						
Total (TS)	EPA 160.3	Water	P, 500 mL	4 °C	7 Days	N/A
Total, dissolved (TDS)	EPA 160.1	Water	P, 500 mL	4 °C	7 Days	N/A
Total, suspended (TSS)	EPA 160.2	Water	P, 500 mL	4 °C	7 Days	N/A
Volatile	EPA 160.4	Water	P, 500 mL	4 °C	7 Days	N/A

Sample Preservation Techniques and Holding Times (continued)

Parameter(s)	Method	Matrix	Container[a]	Preservation[b]	Holding Time[b]	
					Sample	Extract
Aggregate Analytes:						
Total organic halides (TOX)	SW-9020	Water	G, 1 L	4 °C; H_2SO_4 to pH<2	28 Days	N/A
		Solid/Other	G, 125 mL	4 °C	28 Days	N/A
Turbidity	EPA 180.1	Water	P, 500 mL	4 °C	48 Hours	N/A

Key

[a] P=plastic (polyethylene or equivalent), G=glass, G(A)=amber glass. All glass containers (except Teflon-lined septum vials) must have a Teflon-lined screw-cap. These requirements apply to containers provided by the analytical Subcontract Laboratory.

[b] Other regulatory or project requirements may apply. If so, the analytical Subcontract Laboratory will be advised.

[c] The LANL target analyte list for metals includes mercury.

All methods referenced must be the most recent promulgated version.

Sample Request Paperwork	
Requestor	
Email	
Date Needed	
FOCUS AREA:	
Any Rad Van Screening?	☐ Yes ☐ No
Chain of Custody Comments:	
Analysis Charge Code:	
CDM Charge Code:	
Collection Plan Date:	
Field Prep:	
Field Screening: If yes, what Field Screening do you need?	☐ Yes ☐ No
Focus Area Leader:	
Focus Area Leader Phone #:	
Focus Area Leader Mail Stop:	
Lab Report To:	
Lab Report to Phone #:	
Lab Report to Mail Stop:	
Lab Turn Around:	
Number of New Location IDs:	
Number of Samples:	
OU ID:	
PRS ID:	
PRS Type:	
Sample Matrix:	
Sample Usage:	
COC Signature Name:	
Signature Name's Phone #:	
Submittal Date:	
TA ID:	
ER SOP Collection Method:	
Additional Comments:	

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Sample Request Paperwork (Cont.)

Analysis	Number of Samples	Lab
METAL		
VOAGCMS		
SVOC		
PESTPCB		
EPA300 perchlorate only		
SR90		
ISOPU		
GAMMA SPEC		
RVGROSSAB+RVGROSSG		
TCLP Metals		
TCLP VOA		
TCLP SVOC		
TCLP HERB		
TCLP PEST		

Equipment and Supplies Checklist for Sample Containers and Preservation

Forms

- ☐ Sample Collection Logs
- ☐ Daily Activity Log
- ☐ Chain-of-Custody/Request for Analysis Form

Sample Containers (as appropriate)

- ☐ Narrow-mouth amber glass bottles with Teflon-lined caps (0.5, 1, and 2 liters)
- ☐ Amber glass vials with Teflon septa (40 ml)
- ☐ 250 ml sterile bottle
- ☐ wide-mouth polyethylene bottles (0.5, 1, and 2 liters)
- ☐ new or cleaned polyethylene narrow-mouth bottles (1L, .10L, 500 ml, 125 ml)

Sampling Materials

- ☐ ballpoint pen (indelible dark ink)
- felt-tip marker pen (indelible dark ink)
- ☐ 1–14 pH indicator paper
- ☐ ascorbic acid crystals
- ☐ disposable surgical gloves (latex, PVC, other suitable plastic, or rubber)
- ☐ NaOH pellets
- ☐ disposable wipes
- ☐ crystalline $Na_2S_2O_3$
- ☐ methanol and de-ionized water in Teflon wash bottles
- ☐ concentrated HNO_3, H_2SO_4, and HCI
- ☐ temperature probe
- ☐ clipboards
- ☐ de-ionized water
- ☐ duct tape
- ☐ wooden tongue depressors
- ☐ aluminum foil
- ☐ Teflon tape
- ☐ paper towels

Shipping Materials

(Acquire from Sample Coordinator Facility)

- ☐ cardboard boxes
- ☐ ice
- ☐ Blue Ice or equivalent
- ☐ insulated coolers
- ☐ heavy-duty poly bags and ties
- ☐ strapping tape
- ☐ plastic trash-can liners
- ☐ canvas bags
- ☐ parafilm
- ☐ padding for packaging of samples
- ☐ Ziploc bags
- ☐ bubble pack
- ☐ sample labels
- ☐ custody seals or custody tape
- ☐ any PPE listed or required in the SSHASP
- ☐ Other equipment specified in EPA Methods, as needed
- ☐
- ☐
- ☐
- ☐
- ☐

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Los Alamos
Environmental Restoration Project

Acronyms

ASTM – American Society for Testing and Materials

CLP – Contract Laboratory Program

DOT – U.S. Department of Transportation

EPA – U.S. Environmental Protection Agency

IATA – International Air Transport Association

RCRA – Resource Conservation and Recovery Act

RFI – RCRA Facilities Investigation

SMO – Sample Management Office

SW-846 – EPA approved test methods for Solid Waste identified in EPA

TCLP – Toxicity Characteristic Leaching Procedure (Method 1311), which is a codified (10CFR Parts 261, 264, 265, 268, 271, and 302) procedure.